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DEPARTMENT OF THE ARMY 02935.TD  
CORPS OF ENGINEERS, TULSA DISTRICT MAY 97  
JSH

TULSA DISTRICT GUIDE SPECIFICATION

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SECTION 02935

TURF

1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AGRICULTURAL MARKETING SERVICE (AMS)

AMS-01 (Amended thru: Aug 1988) Federal Seed Act  
Regulations (Part 201-202)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 977 (1991) Emulsified Asphalt

ASTM D 2028 (1976; Rev. 1992) Cutback Asphalt (Rapid-  
Curing Type)

AMERICAN SOD PRODUCERS

ASSOCIATION, INC. (ASPA)

ASPA-01 (1988) Guideline Specifications to Turfgrass  
Sodding

COMMERCIAL ITEM DESCRIPTIONS (CID)

CID A-A-1909 (Basic) Fertilizer

1.2 SUBMITTALS

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NOTE: Submittals must be limited to those necessary  
for adequate quality control. The importance of an  
item in the project should be one of the primary  
factors in determining if a submittal for the item  
should be required.

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Government approval is required for submittals with a "GA" designation;  
submittals having a "FIO" designation are for information only. The  
following shall be submitted in accordance with Section 01300 SUBMITTAL  
DESCRIPTIONS:

SD-01 Data

Manufacturer's Catalog Data; FIO. Chemical Treatment Plan; FIO.

Manufacturer's literature discussing physical characteristics, application and installation instructions for erosion control material, and for chemical treatment material. Chemical Treatment Plan with proposed sequence of chemical treatment work. The common name, chemical composition, formulation, concentration, rate and method of application for all materials furnished; and the name and license of the state certified applicator(s) shall be included.

#### SD-13 Certificates

Certificates of Compliance; FIO.

Prior to the delivery of materials, certificates of compliance for the materials listed below shall be submitted certifying that materials meet the requirements specified.

- a. Seed: Mixture percentage, pure live seed, weed seed content, germination.
- b. Sod: Species, mixture percentage, percent purity.
- c. Sprigs: Cultivar, genetic purity.
- d. Fertilizer: Chemical analysis composition percent.
- e. Lime: Chemical analysis.
- f. Asphalt Adhesive
- g. Chemical Treatment Material: For EPA registration and uses.

### 1.3 SOURCE INSPECTIONS

[Sod] [sprigging] material will be subject to inspection by the Contracting Officer at the growing site.

### 1.4 DELIVERY AND STORAGE

#### 1.4.1 Delivery

##### 1.4.1.1 Fertilizer and Lime

Delivery of fertilizer and lime to the site shall be in original, unopened containers bearing manufacturer's chemical analysis. Instead of containers, fertilizer and lime may be furnished in bulk.

##### 1.4.1.2 Chemicals

Chemical treatment materials shall be delivered to the site in the original unopened containers with legible labels indicating the Environmental Protection Agency (EPA) registration number and the manufacturer's registered uses.

#### 1.4.2 Storage

Materials shall be stored in areas designated by the Contracting Officer. [Sod] [sprigs] shall be lightly sprinkled with water, covered with moist

burlap, straw, or other covering; and protected from drying and exposure to wind and direct sunlight until planted. Covering for [sod] [sprigs] shall allow air to circulate and prevent internal heat from building up.

Seed, lime, and fertilizer shall be stored in cool, dry locations away from contaminants.

Chemical treatment materials shall not be stored with other turfing materials.

## 2 PRODUCTS

### 2.1 MATERIALS

#### 2.1.1 Seed

[State-certified] [State-approved] seed of the latest season's crop shall be provided in original sealed packages bearing the producer's guaranteed analysis for mixture percentage, purity, germination, weed seed content, and inert material. Labels shall be in conformance with [AMS-01](#) and applicable state seed laws. Seed mixtures shall be proportioned by weight as follows:

Mixture Percent by Weight	Percent Pure Live Seed	Botanical Name	Common Name
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#### 2.1.2 Sod

Nursery-grown sod shall be [State-certified] [State-approved] [Nursery-grown] sod as classified by applicable state laws and as specified in [ASPA-01](#), Section IV. Sod materials shall conform to ASPA-01. Sod anchors shall be as recommended by the sod supplier. Grass species shall be proportioned as follows:

Botanical Name	Common Name	Mixture Percent
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#### 2.1.3 Sprigs

The cultivar of [ ] shall be provided as healthy living stems, stolons, or rhizomes with attached roots including two to three nodes and from [100 to 150 mm 4-to 6-inches](#) long, without adhering soil, obtained from heavy and dense sod. Sprigs shall be provided which have been grown under climatic conditions similar to those in the locality of the project. Sprigs containing weeds or other detrimental material or that are heat damaged will be rejected.

#### 2.1.4 Lime

Lime shall be agricultural limestone and shall have a minimum calcium carbonate equivalent of 90 percent and shall be ground to such a fineness that at least 90 percent will pass a 10-mesh sieve and at least 50 percent will pass a 60-mesh sieve.

#### 2.1.5 Fertilizer

Commercial grade, free flowing, uniform in composition and conforming to [CID A-A-1909](#), Type I, Class 2 (granular or pelletized). Composition [10-20-10] [13-13-13] [ ] (Nitrogen - phosphorus - potassium ratio)

#### 2.1.6 Mulch

Mulch shall be free from weeds, mold, and other deleterious materials.

##### 2.1.6.1 Straw

Straw shall be stalks from oats, wheat, rye, barley, or rice and shall be furnished in air-dry condition and with a consistency for placing with commercial mulch blowing equipment.

##### 2.1.6.2 Hay

Hay shall be native hay, sudan-grass hay, broomsedge hay, or other herbaceous mowings and shall be furnished in an air-dry condition and with a consistency for placing with commercial mulch blowing equipment.

##### 2.1.6.3 Wood Cellulose Fiber

Wood cellulose fiber shall not contain any growth or germination-inhibiting factors and shall be dyed an appropriate color to facilitate visual metering during application. Composition on air-dry weight basis: 9 to 15 percent moisture, pH range from 4.5 to 6.0. Use with hydroseeding application of grass seed and fertilizer. When added to water, fibers shall form a homogenous slurry.

#### 2.1.7 Asphalt Adhesive

Asphalt adhesive shall be cutback asphalt conforming to ASTM D 2028, designation RC-70 or emulsified asphalt conforming to ASTM D 977, Grade SS-1.

#### 2.1.8 Water

Water shall be of a quality suitable for irrigation.

#### 2.1.9 Chemical Treatment Material

Herbicide, insecticide, and fungicide shall be EPA registered and approved.

#### 2.1.10 Erosion Control Material

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**NOTE: Allow Contractor option for type of erosion control material to be used, unless the contract requirements dictate otherwise.**  
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Soil erosion control shall conform to the following:

##### 2.1.10.1 Blanket

Machine produced mat of wood excelsior formed from a web of interlocking wood fibers, covered on one side with either plastic netting or twisted kraft paper cord netting.

##### 2.1.10.2 Fabric

Knitted construction of polypropylene yarn with uniform mesh openings 19 to 25 mm 3/4-to 1-inch square with strips of biodegradable paper. Filler paper strips shall last 6 to 8 months.

#### 2.1.10.3 Net

Heavy, twisted jute mesh weighing approximately .56 kg per meter 1.22 pounds per linear yard and 1200 mm 4 feet wide with mesh openings of approximately 25 mm 1 inch square.

#### 2.1.10.4 Chemicals

High-polymer synthetic resin or cold water emulsion of selected petroleum resins.

#### 2.1.10.5 Hydrophilic Colloids

Hydrophilic colloids shall be physiologically harmless to plant and animal life, without phytotoxic agents. Colloids shall be naturally occurring, silicate powder based, and shall form a water insoluble membrane after curing. Colloids must resist mold growth.

#### 2.1.10.6 Anchors

Erosion control material anchors shall be as recommended by the manufacturer.

### 3 EXECUTION

#### 3.1 PLANTING TIMES

Seed shall be sown from [ ] to [ ] for [spring] [summer] planting and from [ ] to [ ] for fall planting.

Sod shall be laid from [ ] to [ ] for [spring] [summer] planting and from [ ] to [ ] for fall planting.

Sprigs shall be planted from [ ] to [ ] for [spring] [summer] planting and from [ ] to [ ] for fall planting.

#### 3.2 SITE PREPARATION

##### 3.2.1 Grading

Site preparation work shall be performed only during periods when beneficial results can be obtained. When drought, excessive moisture or other unsatisfactory condition prevails, the work shall be stopped when directed. Finish grades shall be as indicated on drawings, and the placing of topsoil and the smooth grading shall be completed in accordance with [Section 02210 GRADING] [Section 02221 EXCAVATION FILLING AND BACKFILLING FOR BUILDINGS] [Section 02225 EARTHWORK FOR ROADWAYS, RAILROADS, AND AIRFIELDS] [Section 02222 EARTHWORK]. Turf areas shall be filled as needed or have surplus soil removed to attain the finished grade. Drainage patterns shall be maintained as indicated on drawings. Soil used for repair of erosion or grade deficiencies shall conform to topsoil requirements specified in the [Section 02210 GRADING] [Section 02221 EXCAVATION FILLING AND BACKFILLING FOR BUILDINGS] [Section 02225 EARTHWORK FOR ROADWAYS, RAILROADS, AND AIRFIELDS] [Section 02222 EARTHWORK]. Finished grade shall be 25 mm 1 inch below the adjoining grade of any surfaced area. New surfaces shall be blended to existing areas. Lawn areas shall have debris and stones larger than 25 mm 1 inch in any dimension removed from the surface. Field areas shall have debris and stones larger than 75 mm 3 inches in any dimension

removed from the surface. Finished graded areas shall be protected from damage by vehicular or pedestrian traffic and erosion.

### 3.2.2 Lime Application

Lime shall be applied at the rate of [ ] pounds per [acre][hectare] [1000 square feet]. Lime shall be incorporated into the soil to a minimum depth of 100 mm 4 inches or may be incorporated as part of the tillage operation.

### 3.2.3 Fertilizer Application

Fertilizer shall be applied at the rate of [ ] pounds per [acre] [hectare] [1000 square feet]. Fertilizer shall be incorporated into the soil to a minimum depth of 100 mm 4 inches or may be incorporated as part of the tillage or hydroseeding operation.

### 3.2.4 Tillage

Soil shall be tilled to a minimum depth of 100 mm 4 inches by plowing, disking, harrowing, rototilling or other method. On slopes 2 horizontal to 1 vertical and steeper, the soil shall be tilled to a minimum depth of 50 mm 2 inches by scarifying with heavy rakes, or other method. Rototillers shall be used where soil conditions and length of slope permit. On slopes 1 horizontal to 1 vertical and steeper, no tillage is required.

## 3.3 SEEDING

### 3.3.1 General

Prior to seeding, any previously prepared seedbed areas compacted or damaged by interim rains, traffic, or other cause, shall be reworked to restore the ground condition previously specified. Do not broadcast seed or hydroseed when the wind velocity is such as to prevent uniform seed distribution.

### 3.3.2 Broadcast Seeding

Seed shall be uniformly broadcast at the rate of [ ] kg pounds per 1000 square meters feet using broadcast seeders. Half of seed shall be broadcast in one direction, and the remainder at right angles to the first direction. Seed shall be covered to an average depth of 6 mm 1/4 inch by disk harrow, steel mat drag, cultipacker, or other approved device.

### 3.3.3 Drill Seeding

Seed shall be uniformly drilled to an average depth of 13 mm 1/2 inch and at the rate of [ ] kg pounds per 1000 square meters feet using equipment having drills not more than 165 mm 6-1/2 inches apart. Row markers shall be used with the drill seeder.

### 3.3.4 Rolling

Immediately after seeding, except for slopes 3 horizontal to 1 vertical and greater, the entire area shall be firmed with a roller not exceeding 90 pounds for each foot of roller width. Areas which have been hydroseeded or have been seeded with seed drills equipped with rollers shall not be rolled.

### 3.3.5 Hydroseeding

Seed and fertilizer shall be added to water and thoroughly mixed at the rates specified. Wood cellulose fiber mulch shall be added at the rates recommended by the manufacturer after the seed, fertilizer and water have been thoroughly mixed to produce a homogenous slurry. Slurry shall be uniformly applied under pressure over the entire area. Adequate soil moisture shall be ensured by spraying water on the entire hydroseeded area and moisten the soil to a minimum depth of 50 mm 2 inches. Hydroseeded areas shall not be rolled.

## 3.4 MULCHING

### 3.4.1 Application

On the same day as seeding, mulch shall be spread uniformly at the rate of 1-1/2 metric tons per hectare 1-1/2 tons per acre. Mulch shall be spread by hand, blower-type mulch spreader or other approved method. Mulching shall be started on the windward side of relatively flat areas or on the upper part of slopes 2 horizontal and 1 vertical and steeper. The mulch shall not be bunched. All seeded areas shall be mulched on the same day as the seeding.

### 3.4.2 Anchoring

Immediately after spreading, the mulch shall be anchored by a V-type-wheel land packer, a scalloped-disk land packer or other approved method or by spraying asphalt adhesive. When asphalt adhesive method is used, it shall be uniformly applied at the rate of 40 to 50 liters per 100 square meters 10 to 13 gallons per 1000 square feet. Straw or hay applied simultaneously with asphalt adhesive shall be by using a hydro-mulcher. Hydrophilic colloid tackifier shall be applied at rate recommended by manufacturer. The tackifier shall be applied with hydraulic equipment suitable for mixing and applying a uniform mixture.

## 3.5 SODDING

Areas shall be sodded as indicated. Transplanting sod shall conform to ASPA-01. When required, the sod shall be anchored by placing anchors a minimum distance of 600 mm 2 feet on center with a minimum of 2 anchors per sod section. Frayed edges shall be trimmed and holes or missing corners shall be patched in the sod.

## 3.6 SPRIGGING

### 3.6.1 General

Sprigs shall be planted in the areas indicated. The time limitation between harvesting and sprigging shall be 24 hours. Sprigs that have been exposed to heat or excessive drying will be rejected.

### 3.6.2 Broadcast Sprigging

Sprigs shall be broadcast uniformly by hand, with mechanical equipment or other approved method. Sprigs shall be planted to provide a minimum number of 25 viable sprigs per square yard. The maximum space between sprigs shall be 300 mm 12 inches. Sprigs shall be forced into the soil to a minimum depth of 25 mm 1 inch by disk-rolling, pressing with steel matting, or other approved method.

### 3.6.3 Hydroplanting

Sprigs shall be mixed with water and uniformly applied under pressure over the entire area. Sprigs shall be uniformly covered with topsoil to a minimum depth of 25 mm 1 inch. Topsoil shall be as specified in Section 02210 GRADING.

### 3.6.4 Row Sprigging

Sprigs shall be planted in rows spaced a maximum of 300 mm 12 inches apart and to a minimum depth of 25 mm 1 inch with mechanical sprig planter or other methods. Sprigs shall be placed a maximum of 150 mm 6 inches apart in the rows.

### 3.6.5 Overseeding

When required for a quick cover, overseeding shall be in accordance with the applicable portions of paragraph "SEEDING."

### 3.6.6 Rolling

Immediately after completion of the sprigging operation, except on slopes 3 horizontal to 1 vertical or steeper, the entire area shall be rolled with a roller not exceeding 135 kg per meter 90 pounds per foot of roller width.

### 3.6.7 Finishing

The finished surface shall be flush with the finished grade. Approximately 25 percent of the planted sprigs should extend above the soil upon completion of the sprigging operation.

## 3.7 EROSION CONTROL

### 3.7.1 Erosion Control Material

Erosion control material shall be applied in areas indicated and shall be installed in accordance with manufacturer's instructions.

### 3.7.2 Temporary Turf Cover

Temporary turf shall be applied to [ ] [areas indicated] to prevent erosion when finish grading is completed more than 60 days prior to the turfing periods specified above. The temporary seed shall be:

Botanical Name	Common Name	Live Seed
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1/2 of the fertilizer shall be applied and the area tilled as specified above. Seed shall be applied at the rate of [ ] kg pounds per 1000 square meters feet. Areas with the temporary turf cover shall subsequently be prepared, tilled, and turfed with the specified permanent turf materials.

## 3.8 PROTECTION OF TURFED AREAS

Immediately after turfing, the area shall be protected against traffic or other use by erecting barricades and providing signage as required or as directed by the Contracting Officer.



### 3.9 ESTABLISHMENT

#### 3.9.1 Duration

The turf establishment period shall commence upon completion of the last day of the turfing operation and shall continue for a period of 3 months or until all work on the entire project has been completed and accepted, whichever is later.

#### 3.9.2 Stand of Turf

Seeding shall provide a minimum of 50 grass plants per square foot with bare spots not larger than 300 mm 6 inches square. Sod shall provide living turf uniform in color and leaf texture with bare spots shall be not larger than 300 mm 6 inches square square. Sprigging shall provide not less than two turf plants per square foot with bare spots shall be no larger than 450 mm 9 inches square. The total bare spots shall not exceed 2 percent of the total turfed area.

#### 3.9.3 Maintenance

##### 3.9.3.1 Repair

Turf shall be reestablished as specified herein for eroded, damaged, or barren areas. Mulch shall be repaired or replaced as required.

##### 3.9.3.2 Mowing

Turfed areas shall be mowed to a minimum height of [ ] mm inches when the average height of the turf becomes [ ] inches. Clippings shall be removed when the amount of cut turf is heavy enough to damage the turfed areas.

##### 3.9.3.3 Watering

Watering shall be started immediately after completing each day of sodding or sprigging and within 7 days after seeding. Water shall be applied at the rate sufficient to ensure moist soil conditions to a minimum depth of 25 mm 1 inch. Run-off and puddling shall be prevented.

Watering shall be at intervals to obtain a moist soil condition to a minimum depth of 25 mm 1 inch. Frequency of watering and quantity of water shall be adjusted in accordance with the growth of the turf.

##### 3.9.3.4 Post-Fertilization

Fertilizer shall be applied at a rate to provide 2.5 kg 0.5 pounds of available nitrogen per 1000 square meters feet 30 days after planting is performed but not after the beginning of winter dormancy.

##### 3.9.3.5 Chemical Treatment

When a pest, disease, or weedy growth becomes apparent during the Turf Establishment Period, a state certified applicator shall apply required chemicals in accordance with EPA label restrictions and recommendations. Hydraulic equipment for the liquid application of chemicals shall be provided with a leak-proof tank, positive agitation methods, controlled application pressure and metering gauges. Pre-emergent herbicides shall not be used.

### 3.10 FINAL ACCEPTANCE

At the end of the turf establishment period, a final inspection will be made. Final acceptance of the turf will be based upon a stand of turf as defined above. Rejected areas shall be replanted or repaired as directed.